

REMARKS/ARGUMENTS

Entry of this amendment will place the application in condition for allowance, or in better form for appeal. The limitations expressed in the separate claims have been previously examined. No new issues will be raised by entry hereof.

Claims

The examined independent claims were Claims 1, 12 and 24. Upon entry of this amendment, Claims 1 and 24 will be canceled, and Claims 27 and 32 will be rewritten in independent form, leaving Claims 27, 12 and 32 as the independent claims. (All other claims will depend from the independent claims.)

The substance of Claims 27, 12 and 32 will not be changed. The amendment adds the respective limitations of the base Claims 1 and 24 into the rewritten Claims 27 and 32; adds the missing word "are" at line 7 in Claim 27 ("support structures vertically aligned" should be --support structures are vertically aligned -- at Claim 1, line 6, consistent with the existing wording in Claims 12 and 24); corrects the spelling of "layer" to --layer-- in the third subparagraph of Claim 12; corrects the element "a plurality of support structures are disposed in the at least one of the plurality of dielectric layers" to -- the plurality of support structures are disposed in at least one of the plurality of ILD layers" in the first "wherein" subparagraph of Claim 12 to avoid indefiniteness issues consistent with the antecedents thereof; and changes the statement "so that support structures are vertically aligned ..." to -- so that the support structures are vertically aligned-- to avoid indefiniteness issues consistent with the antecedent therefor in the third subparagraph of Claims 27, 12 and 32. Claims 27, 12 and 32 are otherwise the same as already examined.

Claims 27, 12 and 32 were all rejected under 35 USC 102(b) as anticipated by McTeer US2002/0175362 A1 ("McTeer"). Those claims are, however, not so anticipated, and a Notice of Appeal has been filed from that rejection.

For example, Claim 27 includes, *inter alia*, the recitation: "wherein the at least one support structure [disposed in each of the ILD layers at locations overlying each other] is a plurality of support structures ... located directly underneath the solder bump." McTeer does not show this limitation, either expressly or inherently.

McTeer shows two copper plugs 56, 56a "with copper plug 56a being adjacent to, and on top of, the copper plug 56" (para. [0041], lines 8-9). The general mention that "the plurality of copper plugs ... need not be adjacent" (para. [0041], lines 26-27) and that "the invention [i.e., the use of AlN layer for copper interconnect] is not limited to a particular form of interconnect structure, but may be used with any copper interconnect structure such as ... bumps [and] may be

further connected to a bond pad ...” (para. [0043]), does not disclose or suggest plural support structures in each of plural ILD layers at locations overlying each other and located directly underneath a solder bump. Thus, McTeer fails to anticipate Claim 27.

For example, Claim 12 includes, *inter alia*, the recitation: “wherein the plurality of support structures is disposed in at least one of the plurality of ILD layers in an $n \times m$ matrix configuration, where n and m are integers greater than one; and wherein each of the plurality of support structures of each matrix configuration are vertically aligned and the matrix configurations are uniformly distributed below and corresponding to a size of a bond pad disposed on the semiconductor device.” McTeer does not show this limitation, either expressly or inherently.

McTeer shows two copper plugs 56, 56a “with copper plug 56a being adjacent to, and on top of, the copper plug 56” (para. [0041], lines 8-9). The general mentions that “any number of ... interconnect structures are formed” (para. [0040]), “any number of such copper plugs ... may be formed” (para. [0041], lines 3-4), and “the plurality of copper plugs ... need not be adjacent” (para. [0041], lines 26-27) do not disclose or suggest an $n \times m$ (with $n > 1$ and $m > 1$) matrix configuration of the support structures in any one ILD layer. A fortiori, those mentions together with “may be further connected to a bond pad” (para. [0043]), do not disclose or suggest “each of the plurality of support structures of each matrix configuration ... vertically aligned” or “matrix configurations ... uniformly distributed below and corresponding to a size of a bond pad.” Thus, McTeer fails to anticipate Claim 12.

For example, Claim 32 includes, *inter alia*, the recitation: “wherein the at least one support structure [disposed in each of the ILD layers at locations overlying each other] is a plurality of support structures ... located directly underneath the bond pad.” McTeer does not show this limitation, either expressly or inherently.

McTeer shows two copper plugs 56, 56a “with copper plug 56a being adjacent to, and on top of, the copper plug 56” (para. [0041], lines 8-9). The general mention that “the plurality of copper plugs ... need not be adjacent” (para. [0041], lines 26-27) and that “the invention [i.e., the use of ALN layer for copper interconnect] is not limited to a particular form of interconnect structure ... [and] may be further connected to a bond pad ...” (para. [0043]), does not disclose or suggest plural support structures in each of plural ILD layers at locations overlying each other and located directly underneath a bond pad. Thus, McTeer fails to anticipate Claim 32.

The rejection of Claims 27, 12 and 32 under 35 USC 102(b) as being anticipated by McTeer is not sustainable, whether or not this amendment is entered. Entry of this amendment will, however, place Claims 27, 12 and 32 in better form for appeal and remove potential indefiniteness issues. Should the rejection as to Claims 27, 12 and 32 be withdrawn by the Examiner, or be reversed on appeal, entry of this amendment will also place remaining claims in condition for allowance.

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Accordingly, request is made for withdrawal of the rejection as to Claims 27, 12 and 32, entry of this amendment, and allowance of the application, as thus amended.

Respectfully submitted,

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